

TRANSLATION

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------|-----------------------|
| Applicant's or agent's file reference P2004, 0226WO | FOR FURTHER ACTION | | See Form PCT/IPEA/416 |
| International application No. PCT/EP2005/000500 | International filing date (day/month/year) 19.01.2005 | Priority date (day/month/year) 18.03.2004 | |
| International Patent Classification (IPC) or national classification and IPC H01L21/331 | | | |
| Applicant AUSTRIAMICROSYSTEMS AG | | | |

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| <p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of 4 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>4. This report contains indications relating to the following items:</p> <table> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table> | <input checked="" type="checkbox"/> | Box No. I | Basis of the report | <input type="checkbox"/> | Box No. II | Priority | <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability | <input type="checkbox"/> | Box No. IV | Lack of unity of invention | <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | <input type="checkbox"/> | Box No. VI | Certain documents cited | <input type="checkbox"/> | Box No. VII | Certain defects in the international application | <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. II | Priority | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention | | | | | | | | | | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. VI | Certain documents cited | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application | | | | | | | | | | | | | | | | | | | | | | |

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|-----------------------------------------|-----------------------------------|
| Date of submission of the demand | Date of completion of this report |
| Name and mailing address of the IPEA/EP | Authorized officer |
| Facsimile No. | Telephone No. |

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2005/000500

Box No. I Basis of the report

1. With regard to the **language**, this report is based on:
 - the international application in the language in which it was filed
 - the translation of the international application into _____, which is the language of a translation furnished for the purposes of:
 - international search (Rule 12.3(a) and 23.1(b))
 - publication of the international application (Rule 12.4(a))
 - international preliminary examination (Rule 55.2(a) and/or 55.3(a))
2. With regard to the **elements** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):
 - the international application as originally filed/furnished
 - the description:

pages 1-15 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____
 - the claims:

nos. _____ as originally filed/furnished

nos.* _____ as amended (together with any statement) under Article 19 18.10.2005 with letter of 17.10.2005

nos.* 1-14 received by this Authority on 18.10.2005 with letter of 17.10.2005

nos.* _____ received by this Authority on _____
 - the drawings:

sheets 1/3-3/3 as originally filed/furnished

sheets* _____ received by this Authority on _____

sheets* _____ received by this Authority on _____
 - a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. The amendments have resulted in the cancellation of:
 - the description, pages _____
 - the claims, nos. _____
 - the drawings, sheets/figs _____
 - the sequence listing (*specify*): _____
 - any table(s) related to sequence listing (*specify*): _____
4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
 - the description, pages _____
 - the claims, nos. _____
 - the drawings, sheets/figs _____
 - the sequence listing (*specify*): _____
 - any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superceded."

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Box No. V **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

| | | | |
|-------------------------------|--------|------|-----|
| Novelty (N) | Claims | 1-14 | YES |
| | Claims | | NO |
| Inventive step (IS) | Claims | 1-14 | YES |
| | Claims | | NO |
| Industrial applicability (IA) | Claims | 1-14 | YES |
| | Claims | | NO |

2. Citations and explanations (Rule 70.7)

1. Reference is made to the following documents:

D1: US-A-6 028 345 (JOHNSON ET AL)
22 February 2000 (2000-02-22) cited in the application
D2: EP-A-0 219 243 (MONOLITHIC MEMORIES, INC)
22 April 1987 (1987-04-22)

2. Document D1 is considered the prior art closest to the subject matter of claim 1 and discloses (the references between parentheses refer to that document): a method for producing a bipolar transistor with a highly doped extrinsic base (110), in which a base layer (108, 110) is provided on a semiconductor substrate (102), in which a doped dielectric layer (118) is deposited, and in which, in a controlled thermal step, the dopant is diffused from the dielectric layer into the semiconductor substrate, resulting in a low-resistance doped extrinsic base (110).

2.2 The subject matter of claim 1 thus differs from that known from D1 in that the dielectric layer is

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| Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <p>deposited in a non-doped form and only afterwards is a dopant introduced into the dielectric layer. The dopant (BF_2) is introduced following the application of an implantation mask which is structured in such a way that an opening remains in a section provided for the subsequent extrinsic base.</p> <p>2.3 The subject matter of claim 1 is thus novel (PCT Article 33(2)).</p> <p>2.4 The aim of the present invention can therefore be considered that of how to avoid the problems associated with the deposition of a highly doped layer.</p> <p>2.5 Document D2 describes (see D2, page 5, line 14 to page 6, line 3) the deposition of an undoped dielectric layer, which is subsequently doped in order to serve as the dopant source for the underlying semiconductor substrate. However, in D2 the layer which is used as the dopant source is an auxiliary layer which is subsequently removed. In addition, the implanted dopant source in D2 is not used to form an extrinsic base and the dopant is not BF_2. It is therefore not obvious for a person skilled in the art to arrive at the subject matter of claim 1 from a combination of documents D1 and D2 without thereby being inventive.</p> <p>2.6 Claim 1 thus involves an inventive step (PCT Article 33(3)).</p> | |

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2.7 Claims 2-14 are dependent on claim 1 and therefore likewise meet the PCT requirements for novelty and inventive step.